RESPONSE AND REQUEST FOR RECONSIDERATION

Response.

The Examiner had rejected claims 11-13 under 35 USC 112 for their failure to further limit claim 1. These claims have now been deleted, so that this rejection should be withdrawn.

The Examiner also rejected claims 1-16, 25, 27, and 28 as made obvious by the disclosure of Diana, US 5,936,041, and claims 17-24 and 26 as made obvious by a combination of Diana with Steckel, US 5,053,152.

In earlier responses to similar office actions, Applicants submitted declarations demonstrating that materials within the scope of the present invention provide a significant advantage in soot handling and sludge performance, in comparison with the materials of the Diana reference. The examiner, however, was not yet convinced. The outstanding office action suggested the following as concerns:

1. Is there evidence that the improvement is unexpected?
2. Is there reason to believe that the range of the variable tested is critical?
3. Is this a fair comparison against the closest teaching of Diana?
4. Is the showing reasonably commensurate with the scope of the claims?

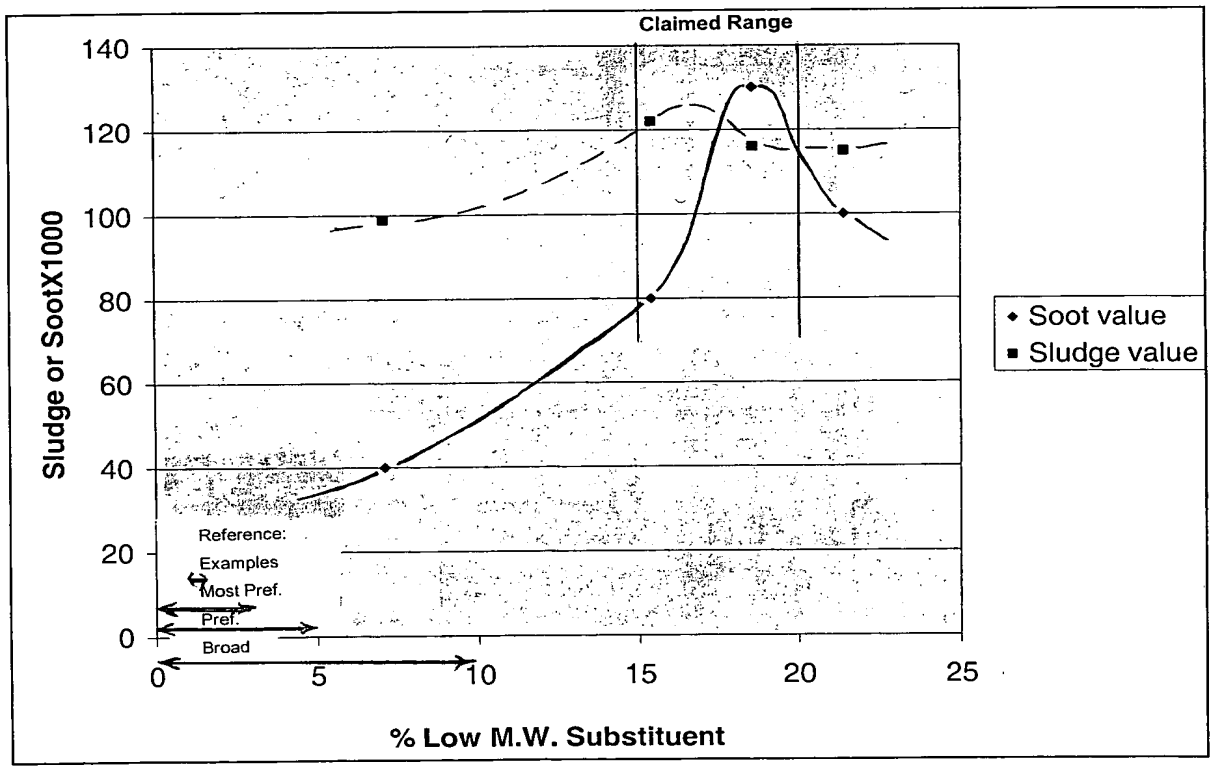
We shall respond to each of these points.

1. The improvement is unexpected. This question is specifically addressed in the Declaration of Dr. Abraham from July 15, 2003. In this Declaration, Dr. Abraham refers to the results relating to soot and sludge performance as well as viscosity variation. He states,

> In the remaining tests reported in my earlier Declaration, the results show unexpected improvement, especially in the Soot T-8 test, particularly at 0.5%, and remarkable improvement in the Sludge test #1173E. Also, the samples of the invention show less change in viscosity between low and high temperatures than does that 7.1% sample. Consequently, the best dispersants for balancing good soot-handling, sludge, seals, blend viscosity, and corrosion performance were surprisingly those with low MW dispersant substituents between 15% and 20%.
>
> I find these results are unexpected because I am unaware of any particular reason to believe that having a limited – but not too low – amount of very low molecular weight polymeric substituent should lead to any improvement in most of these properties. Moreover, the fact that each of these multiple properties is improved simultaneously is unusual, but very advantageous.

This statement – by a person plainly of at least ordinary skill in the art – clearly and adequately explains the unexpected features of the invention that support a conclusion of unobviousness.

2. The range of the variable which was examined is critical to the improvement. The only variable which was changed in these experiments was the variable relating to the amount of low molecular weight (<500 m.w.) substituent component in the dispersant. Amounts tested were 7.1% (representing the prior art), 15.4%, 18.6% (both within the scope of the present claims) and 21.4% (outside the claimed range, but not within the closest prior art). The improvements, particularly in soot performance at 0.5% and sludge, are quite plainly focused on the critical range which is claimed, and appear above the range disclosed in the reference, and especially above the preferred ranges of the reference. This is illustrated in the following figure:



The claimed range clearly appears to represent a critical range for performance.

3. The data presented represents a fair comparison with the closest teaching of Diana. At issue here seems to be whether the example run with 7.1% low molecular weight substituent is a fair and representative value of the teaching of Diana. As shown in the figure above, it is true that the broadest general disclosure in the reference is "up

to 10%." The preferred range, however, is "up to 5%" and the most preferred range is "up to 3%." The actual examples, as reported in Table 2 of Diana, use materials with 1.03 to 1.5 weight percent polymer less than 500 m.w. The comparison was made against a material near the upper limit of the broadest disclosed range in this reference, and indeed about equidistant between the presently claimed range and the examples employed in the reference. In view of the difficulty in preparing samples having precisely defined amounts of low molecular weight polymer, it would be unreasonable to require the preparation of enough data points to accurately define the shape of the curves between 7% and 15% or to try to hit a value of 9.99% right at the edge of the broadest possible disclosure of the reference. It is submitted that the person skilled in the art would recognize that the reference point at 7.1% is a fair representation of the closest teaching of Diana.

4. The showing is reasonably commensurate with the scope of the claims. There are, of course, several variables involved in these claims. The most significant variable by far is the fraction of low molecular weight hydrocarbyl substituent in the dispersant. With regard to that important variable, the data presented (at 15.4% and 18.6%) very nicely fills the claimed range of 15-20%. Other, less critical, variables could include the amount of dispersant present in a lubricant. Lubricants were prepared and tested at the very ordinary and conventional levels of about 7% dispersant (including about 50% conventional diluent oil). It is apparent to the person skilled in the art that any changes in the concentration of a dispersant will have only the expected effects. That is, at increasingly dilute concentrations the dispersant will be correspondingly less effective in its dispersing properties, but those properties will continue to be correspondingly better than those of the materials of the Diana reference. Likewise, with increasing concentrations, some optimal concentration may be reached, beyond which the cost-effectiveness of this or any dispersant may decline. However, even at higher concentrations the present dispersants will exhibit the same qualitative improvements over those of the Diana reference. The important variable, rather, is the amount of low molecular weight substituent; the overall amount of the dispersant is only of trivial significance, by comparison. Accordingly, the data presented in the Declarations of Dr. Abraham is reasonably representative of the scope of the claims.

Conclusion.

For the foregoing reasons it is submitted that the present claims are unobvious and in condition for allowance. The foregoing remarks are believed to be a full and complete response to the outstanding office action. Therefore an early and favorable

reconsideration is respectfully requested. If the Examiner believes that only minor issues remain to be resolved, a telephone call to the Undersigned is suggested.

Any required fees or any deficiency or overpayment in fees should be charged or credited to deposit account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,

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